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10/757,463	01/15/2004	Wei-Hong Wang	2019-0237P	5053

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EXAMINER	
MAYES, MELVIN C	

ART UNIT	PAPER NUMBER
1791	

NOTIFICATION DATE	DELIVERY MODE
06/06/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/757,463	WANG, WEI-HONG	
	Examiner	Art Unit	
	Melvin C. Mayes	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

(1)

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

(2)

Claim 7 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for either impregnating the photocatalyst-coated cloth or sleeve with a solution of an oxidation catalyst **OR** adding oxidation catalyst in preparing the sol mixture, does not reasonably provide enablement for both impregnating the photocatalyst-coated cloth or sleeve with a solution of an oxidation catalyst **AND** adding oxidation catalyst in preparing the sol mixture. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

The specification describes either impregnating the coated cloth or sleeve with oxidation catalyst or providing the oxidation catalyst as blended with the sol mixture which is to be dip coated on the cloth or sleeve. The specification does not disclose or suggest a combination of impregnating, as claimed in Claim 1, with oxidation catalyst added to the sol mixture, as claimed in Claim 7.

Claim Rejections - 35 USC § 103

(3)

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

(4)

Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang 6,135,838 in view of the "Titanium dioxide photocatalysis" article, Taoda et al. 5,670,206 and Yamada et al. 5,897,958.

Wang discloses a method of making a lamp for air cleaning comprising:

formulating a photocatalyst coating sol such as of anatase TiO_2 and dip coating a glass fiber cloth or sleeve with the sol;

drying the coated cloth or sleeve to form a cloth or sleeve coated with anatase TiO_2 crystals;

impregnating the cloth or sleeve with a solution of an oxidation catalyst comprising precious metals or transition metal oxides;

drying again;

wrapping the cloth around a lamp tube or slipping the sleeve on a lamp tube; and

fixing the cloth or sleeve to the lamp by UV resistant glue or laser sintering (col. 3-9). Wang discloses that providing the sol on a glass fiber cloth or sleeve provides an increased surface area of photocatalysts and can allow waste gases in the air to diffuse readily in the photocatalytic active sites. Wang discloses providing the glass fiber cloth or sleeve on a UV lamp tube but does not disclose providing the cloth or sleeve on a fluorescent lamp tube. Wang discloses drying, baking and sintering the photocatalyst sol

coated cloth or sleeve to produce a photocatalyst-coated glass fiber cloth or sleeve but does not specifically disclose that sol comprises nano crystalline anatase particles and that the photocatalyst after baking and sintering is nano-crystalline.

"Titanium dioxide photocatalysis" article teaches that odors objectionable to humans are due to compounds present only on the order of 10 parts per million by volume and at these concentrations, the UV light available from ordinary fluorescent lighting should be sufficient to decompose such compounds when TiO_2 photocatalysts are present (pg. 5).

Taoda et al. teach that a deodorizing lamp for decomposing malodorous substances can be made by providing TiO_2, such as from a sol solution, on the surface of lamps including incandescent lamp, fluorescent lamp, black-light lamp, UV lamp, mercury-vapor lamp, xenon flash lamp, halogen lamp and metal halide lamp, either of cylindrical, bulbous or some complicated shape. For enhancing the effectiveness of the deodorizing lamp, the lamp unit is desired to produce light with a large shortwave light component. The TiO_2 absorbs harmful UV light emitted from the light source and the light emitted from the lamp is easy on the eyes and safe for the human body and can therefore be used as a room lamp (col. 2, line 1-23, col. 4, lines 6-15).

Yamada et al. teach that in making photocatalyst from a titanium oxide sol, the sol contains crystalline particles of anatase type and having average particle size of from 1 to 300 nm dispersed in the sol because smaller than 1 nm and the wavelength range of light having interaction tends to be narrow while if larger than 300 nm, it tends to be difficult to obtain high activities. Yamada et al. teach drying and baking a sol having particles of average particle size of 20 to 30 nm to form a film having titanium oxide particles of

average particle size of 30-40 nm (col. 4, line 64 – col. 5, line 6, col. 10, lines 10-40). Yamada et al. also teach that aqueous TiO_2 sol is stable only in pH range of not higher than 3 or not lower than 10 and teach using either acid or alkali to form the aqueous sol (col. 3, lines 8-12).

It would have been obvious to one of ordinary skill in the art to have modified the method of Wang by using the process to form photocatalyst on a fluorescent lamp tube instead of a UV lamp tube in order to provide a lamp which can be used as a deodorizing lamp for decomposing malodorous substances and also as a lamp that can be used as a room lamp, as taught by Taoda et al. Fixing the cloth or sleeve on a fluorescent lamp tube would have been obvious to one of ordinary skill in the art because the "Titanium dioxide photocatalysis" article teaches that even fluorescent lighting provides sufficient UV light to decompose odors and Taoda et al. teach that lamps for decomposing odors and which can be provided with TiO_2 from a sol solution include not only UV lamps but also incandescent lamps, fluorescent lamps, black-light lamps, mercury-vapor lamps, xenon flash lamps, halogen lamps and metal halide lamps. The use of the sol as coated on a glass fiber cloth instead of directly on the lamps such as a fluorescent lamp would have been obvious to one of ordinary skill in the art for the benefit of increased surface area of photocatalysts which allows gases in the air to diffuse readily in the photocatalytic active sites, as disclosed by Wang.

It would have been obvious to one of ordinary skill in the art to have further modified the method of Wang by providing the sol of nano crystalline anatase particles of size in the range of 1 to 300 nm (nano crystalline), as taught by Yamada et al. as useful particle size for particles in a sol for making photocatalyst because smaller than 1 nm and

the wavelength range of light having interaction tends to be narrow while if larger than 300 nm, it tends to be difficult to obtain high activities. Baking and sintering the photocatalyst sol to form a photocatalyst coating that is nano crystalline would have been obvious to one of ordinary skill in the art because Yamada et al teach that the nano crystalline particles in the sol are dried and baked to for a photocatalyst film having particles of average particle size of 30-40 nm. Because Yamada et al. teach that when particle size is smaller than 1 nm, wavelength range of light having interaction tending to be narrow, while it tends to be difficult to obtain high activities if the size is larger than 300 nm, it would have been obvious to one of ordinary skill in the art to have dried, baked and sintered the sol to form a coating having nano crystalline particles of such size so as to have sufficiently high photocatalyst activity at sufficiently large wavelength range for interaction.

Regarding Claim 1, the use of a thermal plastic ring belt or sewing would have been obvious to one of ordinary skill in the art as alternatives to UV resistant glue or laser sintering for fixing the cloth or sleeve to the lamp.

Regarding Claim 2, Wang discloses that the sol can contain organic and/or inorganic salts of other metals such as W, Zn, Sn and Fe and the sol is made of $Ti(OR)_4$ with alcohol solvent and amount of water.

Regarding Claim 3, Wang discloses that acids HCL and HNO_3 can be added to the TiO_2 sol to adjust the pH thereof to 1-3, thus using an acidic process to prepare the sol.

Regarding Claim 4, it would have been obvious to one of ordinary skill in the art to have modified the method of the references as combined by preparing the TiO_2 sol in

an alkaline process using an alkali, as taught by Yamada et al., as an alternative to using an acid. Using either an acid in an acid process to adjust the sol to pH of 1-3 or using an alkali to adjust the pH of the sol to greater than 10 would have been obvious to one of ordinary skill in the art as alternatives, as Yamada et al. teach that the sol is stable only at either pH less than 3 or greater than 10 which can be done by using either an acid or alkali.

Regarding Claim 5, Wang discloses that the substrates such as glass fiber cloth is transparent.

Regarding Claim 6, Wang discloses that the sol coating on the cloth results in chemical bonding such that the coating does not peel easily from the cloth (col. 12, lines 42-47).

Regarding Claim 7, Wand discloses sintering (baking) the photocatalyst coating on the cloth or sleeve before impregnating with the oxidation catalyst and disclose impregnating with the oxidation catalyst coating by dipping.

Regarding Claim 8, Wang discloses that the oxidation catalyst can be Pd, Pt, Au or Ag precious metal salt solution such that the amount of oxidation catalyst in the photocatalyst is 0-10 wt%.

Regarding Claim 9, Wang discloses that the sol can contain organic and/or inorganic salts of other metals such as W, Zn, Sn and Fe in amount of 1-100% of the TiO_2 and the oxidation catalyst can be Mo, Nb, V, Ce or Cr transition metal salt solution such that the amount of oxidation catalyst in the photocatalyst is 0-10 wt%.

Regarding Claim 10, Wang discloses wrapping the cloth around a lamp tube or slipping the sleeve on a lamp tube.

Regarding Claims 11 and 12, it would have been obvious to one of ordinary skill in the art to have used a fluorescent lamp which emits visible light as well as a small amount of 365nm UV light and 405nm near UV light in order to provide UV light sufficient to decompose odors, as taught by the "Titanium dioxide photocatalysis" article and well as provide light that is easy on the eyes and safe for the human body and can therefore be used as a room lamp, as taught by Taoda et al.

(5)

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 1, and further in view of Ichikawa et al. 6,024,929.

Wang disclose including iron oxide photocatalyst with the TiO_2 photocatalyst.

Ichikawa et al. teach that fluorescent lamps emit light in the wavelength range of 290 nm - 750nm and for deodorizing, TiO_2 absorbs the UV light of wavelength 365 nm while iron oxide photocatalyst absorbs visible light of 405 nm and 436 nm wavelengths and is excited by the absorbed light (col. 7, lines 66-67, col. 8, lines 42-55, col. 11, lines 4-9).

By providing the photocatalyst-coated glass fiber cloth or sleeve on a fluorescent lamp, a lamp that emits visible light in the range of 420-700nm wavelength is obviously provided, as Ichikawa et al. teach that fluorescent lamps emit light in the wavelength range 290 nm - 750nm. Allowing the lamp to emit a small amount of light of wavelengths of 365 nm and 405 nm would have been obvious to one of ordinary skill in the art to provide UV light for absorption by the TiO_2 photocatalyst and light for absorption by the iron oxide photocatalyst for deodorizing, as taught by Ichikawa et al.

Response to Arguments

(6)

Applicant's arguments filed February 29, 2008 have been fully considered but they are not persuasive.

Applicant argues that Wang does not disclose preparing nano crystalline photocatalyst therefore fails to teach "formulating a photocatalyst anatase TiO_2 sol mixture and only by dipping and drying steps in order to coat a glass fiber cloth or glass fiber sleeve with said photocatalyst anatase TiO_2 sol mixture, wherein the photocatalyst anatase TiO_2 sol mixture comprises nano crystalline of anatase TiO_2 particles" and "said nano-crystalline-photocatalyst-coated glass fiber cloth or glass fiber sleeve is excited by UV or visible light to produce photocatalytic interaction" as recited in claim 1.

(7)

According to the present specification, the sol is dried and then baked at low temperature of 100-250 degrees C to form the coated cloth or sleeve. Applicant's claimed invention is not limited to “only by dipping and drying steps…” as argued nor does the specification support “only by dipping and drying steps…” as argued. Providing the particles in the sol and in the dried and baked photocatalyst coating as crystalline and of nanometer size (nano-crystalline) is clearly suggested by Yamada et al. as now set forth in the rejection.

Conclusion

(8)

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melvin C. Mayes whose telephone number is 571-272-1234. The examiner can normally be reached on Mon-Fri 7:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Phillip C. Tucker can be reached on 571-272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Melvin C. Mayes
Primary Examiner
Art Unit 1791

MCM
May 30, 2008

/Melvin C. Mayes/
Primary Examiner, Art Unit 1791